APPENDIX 9

QUESTION #14.A: PROPOSED AMENDED SAMPLING PLAN
February 4, 1988
for
HEXCEL INDUSTRIAL CHEMICALS GROUP
a division of
HEXCEL CORPORATION
205 Main Street
Lodi, Bergen County, New Jersey

ECRA Case # 86009

Prepared by

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T A B L E S

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I. INTRODUCTION

A. Purpose and Scope

This proposed amendment to the sampling program was prepared by ENVIRON Corporation. A Sampling Plan in regard to Hexcel Industrial Chemicals Group (Hexcel) was originally submitted on April 16, 1986. A Revised Sampling Plan was submitted in January, 1987. By letter dated June 18, 1987 the Sampling Plan was further supplemented. The New Jersey Department of Environmental Protection (NJDEP) conditionally approved the Sampling Plan and subsequent revision by letter dated December 28, 1987.

The purpose of this amendment is to incorporate more recent NJDEP policies and procedures regarding the manner in which field investigations are conducted at ECRA sites and to incorporate the recommendations of NJDEP as set forth in its December 28 conditional approval letter as well as the original and revised Sampling Plans. The proposed sampling program includes: monitor well installation, well development, groundwater sampling and analysis, and soil sampling and analysis.

B. Site Description

This facility is located in Lodi, Bergen County, New Jersey. The site is situated in the Piedmont Physiographic Province of New Jersey. Saddle Brook flows along the western border of the property. The surficial soil in the area of the site is alluvial drift which is comprised of gravel,

I. INTRODUCTION (continued)

B. Site Description (continued)

sand and clay. Soil borings have been drilled at the site (described in Appendix 8) and are used to define the geology at the site to a depth of approximately 10 feet. A layer of brown sandy loam covers the site to a depth of approximately six to eight feet. A thin layer of water-bearing gravelly gray sand has been identified (TenEch 1984) between depths of six to eight feet. This is underlain by a gray silty clay to a depth of at least 10 feet or more. At least one boring constructed by TenEch in 1984, appears to have encountered another sandy layer beneath the gray silty clay at a depth of 10 feet.

The water table has been measured at a depth of approximately four feet near Building No. 1 in an oil recovery well (TenEch 1984). The depth to the water table is expected to vary over the site but generally is less than ten feet due to the proximity of Saddle Brook and low topographic relief. Groundwater may flow westward into Saddle Brook, although this has not as yet been verified by on-site measurements.

II. AREAS OF ENVIRONMENTAL CONCERN

Four separate studies have been conducted to characterize soil and water contamination at the site. These studies are briefly summaried below. More detailed information is included in the ECRA II submission.

- TenEch Environmental Engineers Inc. investigated potential fuel oil contamination at the underground storage tanks adjacent to Building No. 1 in 1984. This included drilling twelve borings around the fuel tanks and limited testing (in three borings) for oil and grease.

- Princeton Aqua Science investigated potential contamination by volatile organic compounds (VOCs), total petroleum hydrocarbons (TPHCs), priority pollutant metals (PPMs), bromide, and polychlorinated biphenyls (PCBs) in June, 1985. This investigation included drilling several soil borings in areas of potential environmental contamination.

- Princeton Aqua Science conducted a second investigation of potential contamination by VOCs, TPHCs, PPMs, and PCBs in August, 1985. This investigation extended the earlier study by Princeton Aqua Science (June, 1985) by collection of additional samples at the facility.

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

- o ENVIRON Corporation conducted a limited investigation of VOC and PCB contamination in December, 1985, to resolve inconsistencies in the results of earlier sampling programs.

These investigations are described in detail in Appendix 8 of the ECRA II submission.

Fifteen areas of potential environmental concern (AECs) have been identified. The AECs have been identified based on the four prior site investigations (Appendix 8) and data provided to ENVIRON by Hexcel regarding historical use of the site.

The results of the previous investigations indicate that nine of the AECs (nos. 1-7, 12 and 15) are known to be contaminated above ECRA cleanup guidelines. No information regarding the presence of contaminants is available in six AECs (nos 8-11, 13, and 14), which include four drum storage areas, a loading platform and a catch basin. As discussed more fully below, five AECs are contaminated with TPHCs above ECRA action levels, seven AECs are contaminated with VOCs above ECRA action levels, two AECs are contaminated with PCBs above ECRA action levels, and three AECs are contaminated with lead, one of which exceeds ECRA action levels. One AEC also is contaminated with bromide. All 15 AECs are depicted in Figure 9.1 (attached as Plate 5) and are summarized in Table 9.1.

Table 9.1: Areas of Environmental Concern

Area Environmental Concern	Description
1	Two underground tanks, two above-ground tanks(Tanks 1, 2)
2	Above-ground tank farm (Tanks 13 through 18, Q, R, S)
3	Above-ground tank farm (Tanks 3 through 7)
4	Above-ground tank (Tank 8)
5	Four above-ground tanks (Tanks 9 through 12)
6	Above-ground tank farm (Tanks 21 through 25)
7	Underground gasoline tank and two above-ground tanks (Tanks 26, 27)
8	Empty drum storage area west of Building No. 1
9	Raw material drum storage area west of Building No. 12
10	Empty drum storage area south of Building No. 2
11	Product drum storage area east of Building No. 2
12	Pit along southern half of Building No. 1
13	Loading platform along the western side of Building No. 1
14	Catch basin west of Building No. 1
15	Area within and beneath boiler room

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

AEC No. 1 is located on the southeast corner of Building No. 1. This area contains two underground tanks and two above-ground tanks. The two underground tanks were used to store fuel oil until they were taken out of service in 1984. One of these underground tanks failed the Petro Tite® test conducted in November, 1983, by Fairfield Maintenance Inc. Borings indicate that soil adjacent to the tank is contaminated with TPHCs at concentrations exceeding 100 ppm to a depth of at least eight feet. One of the above-ground tanks (Tank 2) is currently used to store fuel oil. The other above-ground tank (Tank 1) is used to mix and store alkaline cleaners. The area beneath these above-ground tanks is partly unpaved. Borings indicate that the soil under the above-ground tanks is contaminated with TPHCs, VOCs, and PCBs at concentrations exceeding ECRA action levels to a depth of at least four feet.

AEC No. 2 is a tank farm containing nine above-ground storage or mixing tanks (Tanks 13, 14, 15, 16, 17, 18, Q, R, S). Soil borings indicate that the soil in this area is contaminated with VOCs at concentrations exceeding ECRA action levels to a depth of at least 42 inches.

AEC No. 3 is a tank farm containing five above-ground tanks (Tanks 3, chemical tests 4, 5, 6, 7). These tanks are used to store VOCs. Previous soil borings and chemical tests indicate that the soil in this area is

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

contaminated with VOCs at concentrations exceeding ECRA action levels to a depth of at least 30 inches.

AEC No. 4 is in the vicinity of an above-ground storage tank (No. 8) which is used to store VOCs. Previous borings and chemical tests indicate that the soil in this area is contaminated with TPHCs at concentrations exceeding ECRA action levels to a depth of at least 30 inches. The area beneath the tank is unpaved.

AEC No. 5 is the area in the vicinity of four above-ground tanks (Tanks 9, 10, 11, 12). These tanks, which are being used to store alkaline cleaners and VOCs, rest on concrete foundations in two unlined pits. Previous borings inside and outside the pits indicate that the soil is contaminated with VOCs and lead at concentrations exceeding ECRA action levels to a depth of at least 30 inches.

AEC No. 6 is located on the northwest side of Building No. 11, facing Saddle Brook. This area is a tank farm of five above-ground tanks (Tanks 21, 22, 23, 24, 25). Tank 21 was formerly used to store bromide and in now empty. The remaining tanks are used to store VOCs. Previous borings indicate that the soil in this area is contaminated with VOCs at concentrations exceeding ECRA action levels to a depth of at least 36 inches. The area is also contaminated by bromide.

AEC No. 7 is located on a paved area between Building No. 11 and Saddle Brook. Two above-ground ammonia storage tanks and one underground

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

gasoline storage tank are located in this AEC. None of these tanks are now in use. Previous soil borings indicate that the soil in this area is generally contaminated with VOCs, and in some places with lead, at concentrations exceeding ECRA action levels to a depth of at least 30 inches. TPHCs have been detected in the vicinity of the underground gasoline tank at concentrations exceeding 100 ppm at depths of at least 42 inches. The area around the tanks is unpaved.

Four paved areas of the plant are currently used to store empty or full drums. These areas (AEC No. 8, AEC No. 9, AEC No. 10, AEC No. 11) are depicted on Figure 9.1. AEC No. 8 is used to store empty drums on a paved area between Building No. 1 and Saddle Brook. AEC No. 9 is a raw material drum storage area located on pavement between Building No. 12 and Saddle Brook. AEC No. 10 is a paved area between the laboratory building and Building No. 2 which is used to store empty drums. AEC No. 11 is a product drum storage area located east of Building No. 2. All of these areas are presently paved. The sequence and timing of the paving is shown in Plate No. 1 in Appendix 8. AEC No. 10 has been previously tested for priority pollutants in a soil boring 24 inches deep. No constituents were found in this sample above ECRA action levels.

AEC No. 12 is a concrete-lined pit located along the southern half of Building No. 1. The bottom of this pit is approximately 15 to 20 feet below the ground surface. This pit is believed to extend below the water

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

table. Small volumes of groundwater regularly leak into the pit. Several chemical mixing tanks are located in the pit. Water and oil in the pit have been sampled and were found to contain VOCs and PCBs at concentrations exceeding ECRA action levels.

AEC 13 is located below the wooden loading platform in the rear of Building No. 1, along the western wall. The platform was used as a general receiving dock prior to the construction of the warehouse in 1968. The area beneath the platform is unpaved.

AEC 14 is a catch basin located in the rear yard adjacent to a drum storage area (AEC 8) behind Building No. 1. This catch basin is part of the industrial sewer system and receives storm runoff from the rear yard, which is paved. Because the catch basin is part of an active industrial sewer and is normally full, it cannot be drained and inspected for integrity. Therefore, this basin will be tested for integrity by a soil boring immediately adjacent to its outer wall.

AEC 15 is the area within and beneath the boiler near building no. 1 which has been identified from prior sampling to contain TPHC, PCBs and VOCs at concentrations exceeding the ECRA action levels.

The sampling programs described in Appendix 8 indicate that two previously sampled areas do not contain contaminants in concentrations exceeding ECRA action levels. These two areas are discussed below.

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

A. The unpaved discarded equipment storage area has been sampled extensively. A total of seven borings have been drilled and sampled during the four previous sampling programs. VOC concentrations have been reported below ECRA action levels in all samples collected to date, with two exceptions:

(1) Princeton Aqua Science reported extensive chloroform contamination in the samples collected in August, 1985. For reasons described in Appendix 8, the chloroform findings in the August, 1985, samples are not considered to represent actual site conditions.

(2) Soils from boring G-3, also drilled and sampled by Princeton Aqua Science in August, 1985, were reported to contain 30 ppm of VOCs. However, analyses for VOCs from August, 1985, may be in doubt due to what appears to be erroneous chloroform data. Furthermore, Boring EN-6 drilled and sampled by ENVIRON in December, 1985, at approximately the same location as Boring G-3, contains no VOC contamination above ECRA action levels.

For these two reasons, boring G-3 is not believed to represent actual site conditions. Because ENVIRON has not been provided with any information that would suggest that there is a source of contamination in this area, and

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

sampling indicated no contaminated soil, the discarded equipment storage area is not considered to be an AEC. However, a well cluster (well nos. MW14 and MW15) will be placed near the southwest corner of Building No. 2 to determine whether any ground water contamination has occurred.

B. Both water and stream bank soil samples from Saddle Brook have been collected previously (Princeton Aqua Science, June and August, 1985, respectively). No contamination above ECRA action levels was detected in any of these samples, with two exceptions:

(1) Princeton Aqua Science reported extensive chloroform contamination in the bank soil samples collected in August, 1985. For reasons described in Appendix 8, the chloroform findings in the August, 1985, samples are not considered to represent actual site conditions.

(2) A soil sample (F2) by Princeton Aqua Science (August, 1985) indicated contamination of stream bank soil by chloroform (230 ppm) and methylene chloride (20 ppm). No other VOCs were detected in this sample, which would have been expected if the sample were contaminated by discharge from the site. Also, this area is currently protected from on-site storm water run-off by a macadam curb and storm drainage

II. AREAS OF ENVIRONMENTAL CONCERN (continued)

system. Given the apparent erroneous identifications of chloroform in the VOC analysis, and the lack of a known source of methylene chloride in this area, sample F2 does not indicate an area of environmental concern. However, additional soil sampling has been requested by the BEECRA within this area to confirm these results.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern

The purpose of the proposed sampling program is to delineate more completely the areal extent of known contamination in soil within nine of the identified AECs and to provide survey level information by limited sampling in six additional areas that ENVIRON has identified as potential AECs based upon ENVIRON's limited review of the historical use of these areas and the sampling conducted thus far. Proposed sampling locations are depicted on Figure 9.2. The types of samples to be collected and chemical analyses to be performed are summarized in Table 9.2.

In general to determine the maximum depth of contamination in soil above the water table, soil borings will be drilled in the approximate center of each AEC or the presumed source of contamination. These borings will be drilled to the water table which is expected, based on available data, to be at four to six feet below land surface.

The original Sampling Plan proposed to construct soil borings and collect soil samples for chemical testing below the water table. It has been the policy of the Bureau on recent ECRA cases to use soil borings for chemical testing only within the unsaturated zone, and to rely on monitoring wells to delineate the extent, if any, of contamination within the saturated zone (i.e., below the water table). This policy was articulated by the BEECRA in a letter to Automation Industries, Inc. dated

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Table 9.2: Proposed Sampling Locations in Areas of Environmental Concern

AEC [1]	Sampling Location [2]	Number and Type of Samples per Location	Analysis [3]
1	101, 102, 103(a), 104(b), 105, 110	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48" (above water table)	 TPHC VOC, PCB TPHC, VOC, PCB
1	106	Power Auger Boring 4 soil samples o 6-12" o 18-24" o 42-48" (above water table) o 72-78" (gray sand layer)	 TPHC VOC, PCB TPHC, VOC, PCB TPHC, PCB
1	107, 108, 109	Power Auger Boring 2 soil samples: o 42-48" (above water table) o 72-78" (gray sand layer)	TPHC, VOC, PCB
2	201	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48" (above water table)	 TPHC VOC VOC
3	301, 302, 303(c)	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48"	 TPHC VOC VOC
4	401	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48" (above water table)	 TPHC TPHC, VOC TPHC, VOC
5	501, 502, 503, 504	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48" (above water table)	 TPHC, Pb VOC VOC, Pb

Table 9.2: Proposed Sampling Locations in Areas of Environmental Concern (cont.)

AEC [1]	Sampling Location [2]	Number and Type of Samples per Location	Analysis [3]
6	601(d)	Power Auger Boring 3 soil samples:	
		o 6-12"	TPHC
		o 18-24"	PP + 40, Br
		o 42-48" (above water table)	VOC, Br
7	701, 702, 703	Power Auger Boring 3 soil samples:	
		o 6-12"	TPHC
		o 18-24"	TPHC, VOC, PCB, Pb
		o 42-48" (above water table)	TPHC, VOC, PCB, Pb
8	801	Power Auger Boring 3 soil samples:	
		o 6-12"	TPHC
		o 18-24"	PP + 40
		o 42-48" (above water table)	VOC
9	901	Power Auger Boring 3 soil samples:	
		o 6-12"	TPHC
		o 18-24"	PP + 40
		o 42-48" (above water table)	VOC
9	902, 903, 904	Power Auger Boring	
		o 18-24"	VOC
		o 42-48" (above water table)	VOC
10	1001, 1002	Power Auger Boring 3 soil samples:	
		o 6-12"	TPHC
		o 18-24"	VOC
		o 42-48" (above water table)	VOC, TPHC (1002 only)

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Table 9.2: Proposed Sampling Locations in Areas of Environmental Concern (cont.)

AEC [1]	Sampling Location [2]	Number and Type of Samples per Location	Analysis [3]
11	1101	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48" (above water table)	 TPHC PP+40 VOC
11	1102, 1103	Power Auger Boring 2 soil samples: o 18-24" o 42-48" (above water table)	 VOC VOC
12	1201, 1202	Oil in Steam Tunnel	PCB
12	1203, 1204 1205	Wall wipe samples at seeps	PCB
13	1301	Power Auger Boring 2 Soil Samples o 18-24" o 42-48" (above water table)	VOC
13	1302, 1303(e)	Power Auger Boring 3 soil samples: o 6-12" o 18-24" o 42-48"	 TPHC TPHC, VOC, PCB TPHC, VOC, PCB
14	1401	Power Auger Boring 3 soil samples o 6-12" o 18-24" o 42-48" (above water table)	 TPHC, PCB TPHC, VOC, PCB TPHC, VOC, PCB
15	1501	Not drilled due to subsurface obstruction	
15	1502, 1503	Tripod Boring o 10-10.5" (above water table)	 TPHC, PCB, VOC
	1504, 1505	Tripod Boring o 42-48" (above water table)	 TPHC, PCB, VOC

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Table 9.2: Proposed Sampling Locations in Areas of Environmental Concern (cont.)

AEC [1]	Sampling Location[2]	Number and Type of Samples per Location	Analysis[3]
	1506(f)	Power Auger Boring 3 soil samples:	
		o 6-12"	TPHC
		o 18-24	TPHC, VOC, PCB
		o 42-48" (above water table)	TPHC, VOC, PCB
Background	BG1	Power Auger Boring	
		o 42-48" (above water table)	PP + 40

1 Area of Environmental Concern.
2 Sampling locations are depicted in Figure 9.2.
3 TPHC: Total Petroleum Hydrocarbons - Water samples will be analyzed for TPHCs by EPA Method 418.1, and soil samples by EPA Method 418.1 following Soxhlet extraction.
VOC: Volatile Organic Compounds - Water samples will be analyzed for VOCs by by EPA Method 624, and soil samples by field head space test and EPA Method SW846:8240 (selected samples).
pH: The degree of acidity of water samples will be determined in the field.
Pb: Lead - Water sampales will be analyzed for lead by EPA Method 239.1, and soil samples by EPA Method 7420.
PCB: Polychlorinated Biphenyls - Water samples will be analyzed for PCBs by EPA Method 608, and soil samples by EPA Method SW846:8080.
Br: Bromide - Samples will be analyzed for bromide by EPA Method 320.1

(a) Soil Boring 103 will be drilled as part of the construction of Monitor Well No. MW3.
(b) Soil Boring 104 will be drilled as part of the construction of Monitor Well No. MW18.
(c) Soil Boring 303 will be drilled as part of the construction of Monitor Well No. MW4.
(d) Soil Boring 602 will be drilled as part of the construction of Monitor Well No. MW7.
(e) Soil Boring 1303 will be drilled as part of the construction of Monitor Well No. MW16.
(f) Soil Boring 1506 will be drilled as part of the construction of Monitor Well No. MW17.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

March 27, 1987, regarding ECRA Case No. 85310, in which the use of soil borings in lieu of monitoring wells was rejected for the identification of chemicals within the saturated zone. Accordingly, this sampling plan has been amended to limit soil boring sampling for chemical analysis to the unsaturated zone.

Based on preliminary information, it is expected that the water table will be approximately 4 to 5 feet below grade over most of the site. Therefore, it is expected that in most soil borings two soil horizons, from ground surface to 2 feet, and within the six inches above the water table, will be sampled for chemical testing. In general, the samples collected at the depth interval from 6 to 12 inches will be tested for TPHC. Other chemical tests will be conducted on samples in the interval of 18 to 24 inches, including analyses for priority pollutants and VOCs. The deeper sample (immediately above the water table) will be tested for VOCs, and within certain areas for TPHC, PCBs and other chemicals. If the water table is found to be deeper than 6 feet at a particular soil boring, an intermediate sample may be collected if appropriate between the soil surface and water table. Based on available information which suggest that the water is relatively shallow over most of the site, such intermediate samples are not believed to be necessary.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

Any chemical contamination within the saturated zone will be investigated by the use of monitoring wells. Seven well nests are proposed to monitor the water table and deeper aquifer at the site. These nests are located strategically to monitor identified AECs or areas used for chemical processing and storage. An additional three wells will be constructed in the shallower water table unit to investigate the extent of oil contamination in the vicinity of the boiler room (AEC 15). A background well will be constructed near Main Street on the eastern portion of the property. The proposed ground water monitoring network includes eighteen separate wells within the approximately 2 1/2 acre site. This network is sufficient to define the extent of any contamination within the ground water systems and to develop appropriate cleanup plans. (See subsection B for a more complete description of the proposed monitoring well program).

In the conditional letter of approval of the original Sampling Plan, the BEECRA recommended that monitoring wells be constructed within the Molnar Road right-of-way. Molnar Road is the only vehicular access to the facility and to adjoining chemical facilities to the south. In order to construct monitoring wells within the right-of-way of Molnar Road, substantial obstruction of this access would be required. As an alternative to constructing monitoring wells, it is proposed that soil borings be used to collect samples within the upper saturated zone to

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

identify the extent, if any, of oil and PCB contamination within the road right-of-way. If such contamination is identified, monitoring wells may be constructed in the future to define the thickness of the oil layer. This proposal was discussed with Mr. Jeff Fehr and it is understood that he is in agreement with this approach, given the constraints and problems associated with well construction within the public right-of-way.

The original Sampling Plan proposed an extensive series of soil borings around identified AECs. These soil borings were intended to define the outer boundary of contamination in areas where prior sampling had indicated contamination of soil. In other AECs, for which no data has been collected as yet, soil borings have been proposed in the center of these areas to determine if any contamination is present within the unsaturated zone.

The original Sampling Plan proposed a soil boring investigative program that extended into the saturated zone. As discussed above, the soil boring program, as proposed in this amended Sampling Plan, will limit its investigation to the unsaturated zone. Within specific AECs, additional modifications to the soil boring program from those recommended in the conditional approval letter are proposed. These modifications are described in detail for each AEC below.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

AEC no. 1 is contaminated by TPHCs, VOCs and PCBs at concentrations exceeding ECRA action levels. Contamination has generally been identified within the soils immediately above and within the saturated zone (beginning approximately 4 feet below grade). Seven soil borings (nos. 101-107) were originally proposed to define the lateral extent of contamination in this AEC. These borings are depicted in Figure 9.2. In order to define the extent, if any, of lateral migration of TPHC, PCBs and VOCs within the Molnar Road right-of-way, two additional soil borings (nos. 108 and 109) are now proposed. In addition, a soil boring has been requested by the BEECRA (no. 110) in the vicinity of the aboveground fuel storage tank. Therefore, the amended Sampling Plan includes ten soil borings within AEC-1. Specific chemical tests proposed to be conducted on the samples collected from these borings are identified in table 9.2.

AEC no. 2 has been previously identified to be contaminated with VOCs at concentrations exceeding ECRA action levels. Sample nos. A-8 and A-9 collected by PAS in August 1985 indicated that VOCs are present at a depth of approximately 42 inches in soil. Chemical tests for base-neutral priority pollutants also identified one chemical (napthalene) in excess of ECRA action levels.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

The original Sampling Plan proposed a boring (no. 201) in the vicinity of the aboveground storage tanks, more or less in the center of the AEC. However, existing data are sufficient to establish that VOCs are present above ECRA action levels; accordingly this proposal is withdrawn. Additional borings are proposed beyond the immediate area of the storage tanks to determine the lateral extent of soil contamination. Within this AEC, these borings include boring no. 201 (formerly no. 202), and boring nos. 106 and 501, which will provide relevant data on shallow contamination, if any, in the same vicinity. In light of earlier priority pollutant and other chemical tests which have established that only VOCs are present above ECRA action levels, the additional priority pollutant + 40 analyses requested by the BEECRA in the center of this AEC is not warranted and has not been included in this amended Sampling Plan.

AEC no. 3 is contaminated with VOCs at concentrations exceeding ECRA action levels to a depth of at least 30 inches. Three soil borings (nos. 301, 302, and 303) will be constructed within the unsaturated zone to define the vertical extent of VOC contamination above the water table.

AEC no. 4 is contaminated with TPHC at concentrations exceeding ECRA action levels to a depth of at least 30 inches. One soil boring (no. 401) will be constructed near the western edge of this AEC to determine if TPHC and VOCs are present within the unsaturated zone.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

AEC no. 5 has been previously tested for priority pollutants (sample no. C-5 collected by PAS in June 1985). Subsequent tests were also conducted within this area for VOCs and base neutral compounds at a depth of 18-24 inches. These tests identified VOCs and lead to be present within this AEC above ECRA action levels. No other priority pollutant chemicals were detected above action levels. Three soil borings (nos. 501-503) have been proposed within this AEC within the unsaturated zone to confirm the prior identification of VOCs. As requested by the BEECRA, an additional soil boring (no. 504) will be included within this AEC. In view of the prior chemical testing for priority pollutants and subsequent tests for VOCs and base-neutral compounds, which failed to identify any chemical constituents other than VOCs and lead, the requested priority pollutant + 40 analysis of a soil sample within this area is not warranted, and has not been included in this proposed amendment to the sampling plan.

AEC no. 6 is contaminated by VOCs at concentrations exceeding ECRA action levels to a depth of at least 36 inches. This AEC contains four aboveground chemical storage tanks which are constructed on a concrete pad and contained by a concrete block dike. Within one corner of the dike, a drain allows runoff (or any spillage) to discharge beyond the containment wall onto an area of exposed soil. This drain is located in the southwest corner of the containment dike.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

Prior chemical tests by PAS on soil samples outside this perimeter dike indicate that VOCs are present in soils near this discharge drain. Two other soil samples collected outside the dike perimeter failed to detect any VOCs. The original Sampling Plan proposed three soil borings outside the perimeter. In the conditional approval letter, the BEECRA requested a fourth soil boring (no. 604) be added to this investigation. In view of the prior chemical testing by PAS, which failed to identify VOCs except near the drain through the containment dike, and based on a physical inspection by ENVIRON which indicates that the only pathway for release from this AEC is through this drain, only one soil boring immediately outside this drain is warranted in this case. Therefore, the proposed amended Sampling Plan includes only one boring (no. 601) in southwest corner of this AEC. As requested by the BEECRA, priority pollutant + 40 and bromide analyses will be conducted on a sample from this boring at a depth of 18-24 inches. A second sample will collected immediately above the water table for VOC and Br analysis.

AEC no. 7 has been identified by prior sampling to be contaminated with VOCs and lead at concentrations exceeding ECRA action levels. Two priority pollutants tests within this general area (nos. C-1 and C-2) were performed by PAS in June 1985. Only VOCs and lead were detected above ECRA action levels.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

Two soil samples were proposed in the original Sampling Plan within this AEC. Sample no. 701 was to be constructed next to the industrial sewer. Sample no. 702 was to be constructed next to an abandoned underground gasoline storage tank. In addition, two soil borings have been recommended by the BEECRA to be constructed within this AEC (boring nos. 703 and 704, located to the southwest and northeast of boring 702). After further review, a total of three soil borings are recommended by ENVIRON in this area. Two borings (nos. 701 and 703) should be constructed adjacent to the industrial sewer. A third boring (no. 702) should be constructed next to the abandoned gasoline storage tank. Two monitoring wells are also proposed to be constructed within this general area approximately 40 feet west of the abandoned underground tank. All soil samples from within this AEC are proposed to be tested for TPHC, VOCs and PCBs based on prior detection of these chemicals within soil and the adjoining industrial sewer which crosses this AEC.

AEC no. 8 has not been previously tested for chemical constituents. This AEC is proposed to be tested by a single soil boring (no. 801) which will be located more or less in the center of the AEC. As recommended by the BEECRA, the shallower soil sample from this boring (at a depth of 18-24 inches) will be tested for priority pollutants + 40. A deeper boring (immediately above the water table) will be tested for VOCs. A second

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

boring (no. 802) was recommended by the BEECRA to be constructed in this AEC adjacent to the stormwater catch basin. This catch basin has been identified separately as AEC no. 14 and a boring (no. 1401) has been proposed to be constructed adjacent to this catch basin to test its integrity. The BEECRA has recommended that the boring be constructed along the east wall of the catch basin. Boring 1401 will be relocated to this position as recommended.

AEC no. 9 has not been previously tested for chemical constituents. A single soil boring (no. 901) was recommended in the original Sampling Plan to be constructed more or less in the center of this AEC. As recommended by the BEECRA, the shallower soil sample from this boring will be tested for priority pollutants + 40. A deeper soil sample immediately above the water table will be tested for VOCs. In addition, as recommended by the BEECRA three soil borings (nos. 902-904) will be constructed beyond the edge of pavement on the western property boundary (along the bank of Saddlebrook). These soil borings will be drilled to the water table and soil samples will be collected for analysis of VOCs.

AEC no. 10 has been previously tested for priority pollutants + 40 at a depth of 18-24 inches (sample no. C-3 collected by PAS in June 1985). No chemicals were detected above ECRA action levels. In order to verify this earlier finding, one soil boring was proposed in the original Sampling Plan

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

(no. 1001). This boring will be tested for TPHC and VOCs. A second soil boring (no. 1002) has been recommended by the BEECRA in the vicinity of an oil stain on the pavement near the truck ramp. This boring will be constructed and samples tested for TPHC and VOCs as recommended. In view of the earlier testing for priority pollutants in this AEC, an additional test for priority pollutants, as recommended by the BEECRA, is not warranted and no further priority pollutant testing is included in this AEC in this amended Sampling Plan.

AEC no. 11 has been proposed to be tested by a single soil boring (no. 1101) which will be located more or less in the center of the AEC. The BEECRA has recommended that this boring be constructed adjacent to the stormwater catch basin. The boring will be so located. No prior chemical testing for priority pollutants has been conducted on soils in this AEC, and as recommended by the BEECRA, the shallow soil sample from boring no. 1101 (18-24") will be tested for priority pollutants + 40. In addition, two borings will be constructed immediately off the edge of pavement on the northeast side of this AEC. Two samples will be collected from each of these borings and tested for VOCs.

AEC no. 12 has been previously tested on numerous occasions for VOCs and PCBs. These prior test data have been provided to the BEECRA in writing (in a letter dated June 18, 1987), and include some samples which

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

were identified in the original Sampling Plan. In particular, sample nos. 1201 and 1202 have already been collected and tested. As recommended by the BEECRA, two additional samples of oil will be collected from the steam tunnel for testing for PCBs. In addition, three wipe samples (nos. 1203-1205) will be taken from cracks in the concrete wall in AEC no. 6 where oil staining is evident. These wipe samples will be tested for PCBs.

AEC no. 13 is a loading dock to the rear of building no. 1 and the boiler room. Three soil borings will be constructed in the vicinity of this loading dock (nos. 1301, 1302 and 1303). Soil samples from boring 1301 will be tested for VOCs. Samples from borings nos. 1302 and 1303 will be tested for TPHCs, VOCs and PCBs.

AEC no. 14 is a stormwater catch basin in the rear property adjacent to AEC nos. 7 and 8. This catch basin is part of the industrial sewer and has been previously identified to be contaminated with PCBs. A single soil boring (no. 1401) will be constructed adjacent to this catch basin to test its integrity. This boring will be constructed to the water table and three soil samples will be collected for chemical testing. Proposed tests include TPHCs, VOCs and PCBs.

AEC no. 15 has been previously tested by construction of soil borings and collection of samples for chemical analysis. Five soil borings were proposed within this AEC in the June 18, 1987 revision to the Sampling

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES

A. Sampling in Areas of Environmental Concern (continued)

Plan. Four of these borings (nos. 1502-1505) have been constructed as proposed. One boring (no. 1501) could not be constructed due to an obstruction beneath the boiler room floor which prevented advancement of the boring. The data from chemical analyses of samples from these borings have been previously submitted in writing to the BEECRA in a letter dated September 2, 1987. One additional boring (no. 1506) is proposed as part of the construction of monitoring well MW17 in the rear portion of this AEC.

A final soil boring (no. BG1) will be constructed in the eastern portion of the property as part of the construction of the background monitoring well. A soil sample will be collected from this boring immediately above the water table for chemical testing of priority pollutants + 40.

To date the deepest soil borings at the site have been constructed to a depth of approximately 10 feet. In order to confirm the general site geology, certain borings will be drilled to a depth of 20 approximately feet at the perimeter of the site as part of the construction of the deeper monitoring wells (nos. MW1, MW9, MW11, MW15) before drilling in AECs that are known to be contaminated.

To determine the areal extent of contamination, soil borings will also be drilled around the perimeter of those AECs with known contamination in shallow soils. These borings will be constructed in areas that do not

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES (continued)

A. Sampling in Areas of Environmental Concern (continued)

appear, based on current data and a visual inspection of the site, to be contaminated at levels of concern. These borings will be used to define the lateral exent of contamination. These perimeter borings will be drilled to the water table. For the purposes of this amended Sampling Plan, it is assumed that these borings will be four feet deep. The actual depth of these borings may vary depending on site conditions.

It is estimated that in general three soil samples will be collected from these shallow borings. The first sample will be collected at 6-12" below pavement, in the first soil layer beneath the subgrade, for TPHC analysis. The second sample will be collected at 18-24" for VOC or PP + 40 analysis. The third sample will be collected in the six-inch soil increment above the water table for chemical testing as specified in Table 9.2. In general soil samples will not be collected below the water table for chemical analysis except in AEC 1 where selected samples will be collected within the upper three feet of the saturated zone for TPHC/PCB analysis, due to an access constraints on construction of shallow wells within the Molnar Road right-of-way.

Chemical analyses of soil samples will be conducted for parameters that, based on prior sample results and information about manufacturing practices, are expected to be found at each AEC. VOCs, PCBs and oil (TPHC) have been identified as the predominant contaminants at the site (refer to

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES (continued)

A. Sampling in Areas of Environmental Concern (continued)

discussion in Appendix 8). VOCs (predominantly aliphatic-compounds) have been identified at nine AECs by the prior sampling program and are believed, based on current data, to be the most widespread contaminants at the site.

In order to define the horizontal and vertical extent of these contaminants, a large number of soil and water samples may need to be analyzed. To provide a technologically effective and cost efficient program of analysis, two levels of sample testing are proposed. First, all samples identified to be analyzed for VOCs will be analyzed by a field screening procedure to qualitatively identify the level of total volatiles in each sample by use of a standard headspace test with an HNu photoionization detector. In order to ensure uniformity in the headspace test results all samples will be heated for 30 minutes in a 20°C water bath before headspace tests are conducted. Sample blanks and duplicates will also be run in the headspace test at a frequency of approximately five percent each.

Secondly, approximately four out of every ten soil samples identified for VOC analysis will be quantitatively analyzed by a certified laboratory for VOCs using EPA Method 8240. Prior analyses indicate that aliphatic, chlorinated organic compounds are the predominant contaminants at the site. Aromatic compounds, when identified at the site, have been coincident with higher levels of other aliphatic VOCs. The quantitative

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES (continued)

A. Sampling in Areas of Environmental Concern (continued)

analysis of selected samples by Method 8240 serves two purposes. First, it establishes a measure of the reliability and accuracy of the field screening procedure and provides a data base from which headspace test results can be correlated to total VOCs. Secondly, it establishes specific VOC compounds which are present that may be of concern under ECRA. Samples would be selected for laboratory analysis over a range of VOC concentrations. Also samples which are used to define the boundary of the contaminated zone, i.e., samples which produce no HNu response above background in the headspace test, will be tested in the laboratory by Method 8240.

The proposed analytical approach of screening all soil samples for total VOCs by a field headspace test and quantitative analysis and verification for selected soil samples by EPA Method 8240 (approximately 40 percent of all samples) will effectively identify the extent and degree of site contamination sufficient to develop clean-up strategies and designs. Further verification-sampling of the effectiveness of clean-up is also anticipated as part of the actual clean-up construction. The design of this verification monitoring will be addressed in the site clean-up plan.

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES (continued)

B. Sampling For Characterization of Hydrogeologic Conditions

Based on the site topography, it is anticipated that shallow groundwater flows westward across the site toward Saddle Brook, although the direction of flow may vary seasonally and has not as yet been verified by on-site measurements. It is proposed to construct monitoring wells downgradient of those AECs with previously documented contamination in order to determine if groundwater has been impacted. Eighteen monitoring wells (including seven well nests plus a background well) will be installed throughout the site as depicted in Figure 9.2. Shallow wells will monitor the gray sand layer above the clay at a depth of six to eight feet. Due to the shallowness of these wells, it is anticipated that no more than six feet of well screen will be installed. Eight deeper wells will monitor the first permeable or sandy zone below the subsurface layer of gray clay. At present, there are no conclusive site-specific data on the thickness of this gray clay layer. For the purposes of this amended Sampling Plan, it is assumed that these deep monitoring wells will be 20 feet deep. This may change depending on site conditions encountered during drilling. If no sand unit is found at the site beneath the subsurface layer of gray clay, then only the shallow wells will be constructed.

All shallow monitoring wells will be located adjacent to deep monitoring wells, as well nests. Soil samples will be collected from five

III. PROPOSED SAMPLING LOCATIONS AND ANALYSES (continued)

B. Sampling For Characterization of Hydrogeologic Conditions (continued)

of the monitoring wells (MW1, MW3, MW4, MW7 and MW17) during construction in order to further evaluate the area for soil contamination.

Chemical analyses of groundwater samples are outlined in Table 9.3. The proposed analytical parameters have been selected based on prior identification of contamination at specific AECs and known uses of chemicals at the site. Two wells (Nos. MW4 and MW5) will be tested for TPHC and VOCs. These wells are downgradient of AEC 3 and AEC 4 where VOCs have been detected in soil. Prior tests for priority pollutants (sample no. C-6 collected by PAS in June, 1985) did not detect any other constituents above ECRA action levels in this area. Monitoring well nos. MW2, MW3, MW17 and MW18 are proposed to be tested for TPHC, PCBs, metals and VOCs. These wells adjoin AEC 1 and AEC 15, and the proposed constituents have been previously detected in this area. A prior test of a water sample from the oil recovery well by PAS for priority pollutants did not detect other constituents above ECRA action levels, so that priority pollutant testing of these four wells (nos. MW2, MW3, MW17 and MW18) is not warranted and has not been proposed. Water samples from all other on-site wells will be sampled for priority pollutants + 40 and TPHC.

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Table 9.3: Additional Proposed Sampling

AEC [1]	Sampling Location [2]	Number and Type of Samples per Location	Analysis [3]
Background	MW1	Deep Monitor Well* 1 groundwater sample	TPHC, PP+40
1, 12	MW2	Shallow Monitor Well* 1 groundwater sample	TPHC, VOC, PCB, PPM
1, 12	MW3	Deep Monitor Well 1 groundwater sample	TPHC, VOC, PCB, PPM
3, 4	MW4	Shallow Monitor Well 1 groundwater sample	TPHC, VOC
3, 4	MW5	Deep Monitor Well 1 groundwater sample	TPHC, VOC
6, 7	MW6	Shallow Monitor Well 1 groundwater sample	TPHC, PP+40
6, 7	MW7	Deep Monitor Well 1 groundwater sample	TPHC, PP+40
7	MW8	Shallow Monitor Well 1 groundwater sample	TPHC, PP+40
7	MW9	Deep Monitor Well 1 groundwater sample	TPHC, PP+40
12	MW10	Shallow Monitor Well 1 groundwater sample	TPHC, PP+40
12	MW11	Deep Monitor Well 1 groundwater sample	TPHC, PP+40
Downgradient	MW12	Shallow Monitor Well 1 groundwater sample	TPHC, PP+40
Downgradient	MW13	Deep Monitor Well 1 groundwater sample	TPHC, PP+40

* Shallow monitor wells will be screened in the gray sand layer at a depth of approximately 6 to 8 feet. Deep monitor wells will be screened in the first permeable or sandy layer below the subsurface layer of gray clay.

Table 9.3: Additional Proposed Sampling (continued)

AEC [1]	Sampling Location[2]	Number and Type of Samples per Location	Analysis [3]
Downgradient	MW14	Shallow Monitor Well 1 groundwater sample	TPHC, PP+40
Downgradient	MW15	Deep Monitor Well 1 groundwater sample	TPHC, PP+40
12/15	MW16	Shallow Monitor Well 1 ground water sample	TPHC, PP+40
15	MW17	Shallow Monitor Well 1 ground water sample	TPHC, VOC, PCB, PPM
1	MW18	Shallow Monitor Well 1 ground water sample	TPHC, VOC, PCB, PPM

Footnotes

1 Area of Environmental Concern.

2 Sampling locations are depicted in Figure 9.2.

3 TPHC: Total Petroleum Hydrocarbons - Water samples will be analyzed for TPHCs by EPA Method 418.1.
VOC: Volatile Organic Compounds - Water samples will be analyzed for VOCs by by EPA Method 624.
pH: To be measured in the field.
Pb: Lead - Water sampales will be analyzed for lead by EPA Method 239.2.
PCB: Polychlorinated Biphenyls - Water samples will be analyzed for PCBs by EPA Method 608.
Br: Bromide - Samples will be analyzed for bromide by EPA Method 320.1
PP+40: The 129 USEPA priority pollutants plus identification of 40 other compounds will be analyzed by a series of analytical methods known collectively as the USEPA Priority Pollutant Plus 40 analysis.
PPM: Priority pollutant metals by EPA Method 200 series.

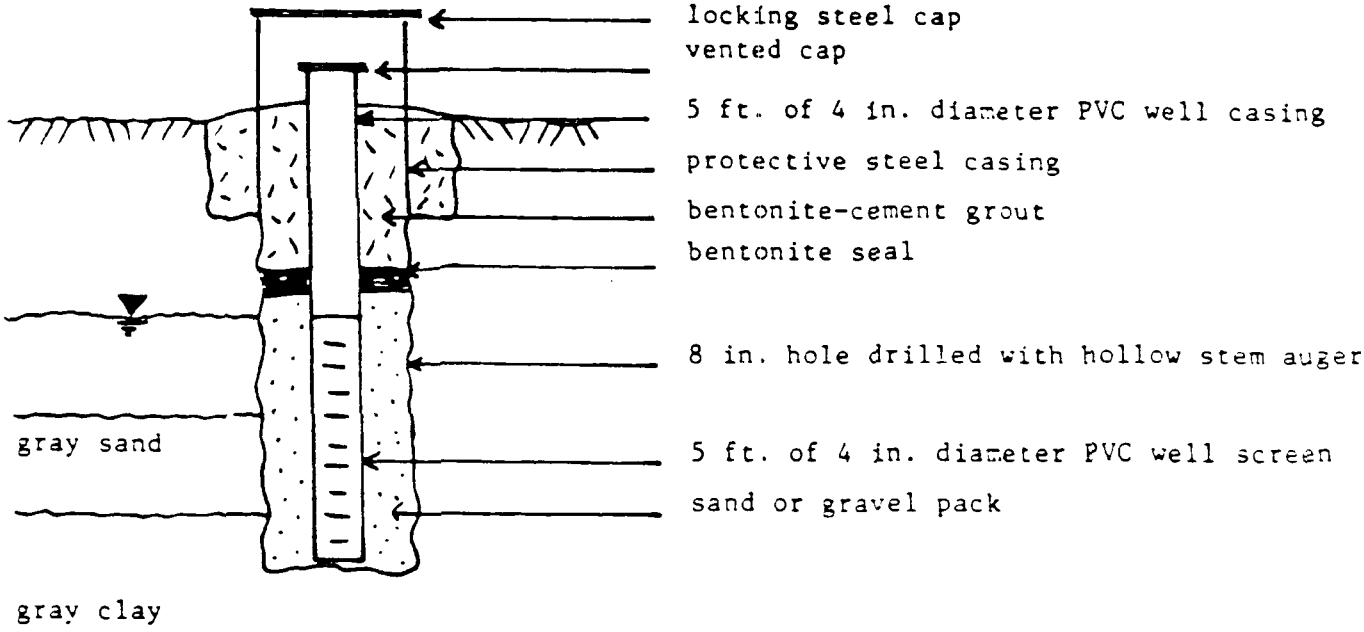
IV. SAMPLING METHODOLOGIES

A. Well Construction

The typical well construction details for the shallow and deep monitoring wells to be installed at the site are shown in Figures 9.3 and 9.4 and conform with DEP specifications. One of the licensed well drillers on the staff of Empire Drilling Co. will construct the monitoring wells.

Boreholes for the shallow monitoring wells will be drilled with a hollow stem auger. Boreholes for the deep monitoring wells will be drilled by a telescope (double) casing method. A temporary or permanent casing for the deep monitoring wells will be grouted or driven into the subsurface layer of gray clay in order to prevent any contamination in the shallower gray sand layer from migrating into deeper aquifers. Well construction will include 4-inch diameter PVC casing and screen. If possible, the stickup will be adjusted to be above flood levels. If necessary, sealed casing will be used.

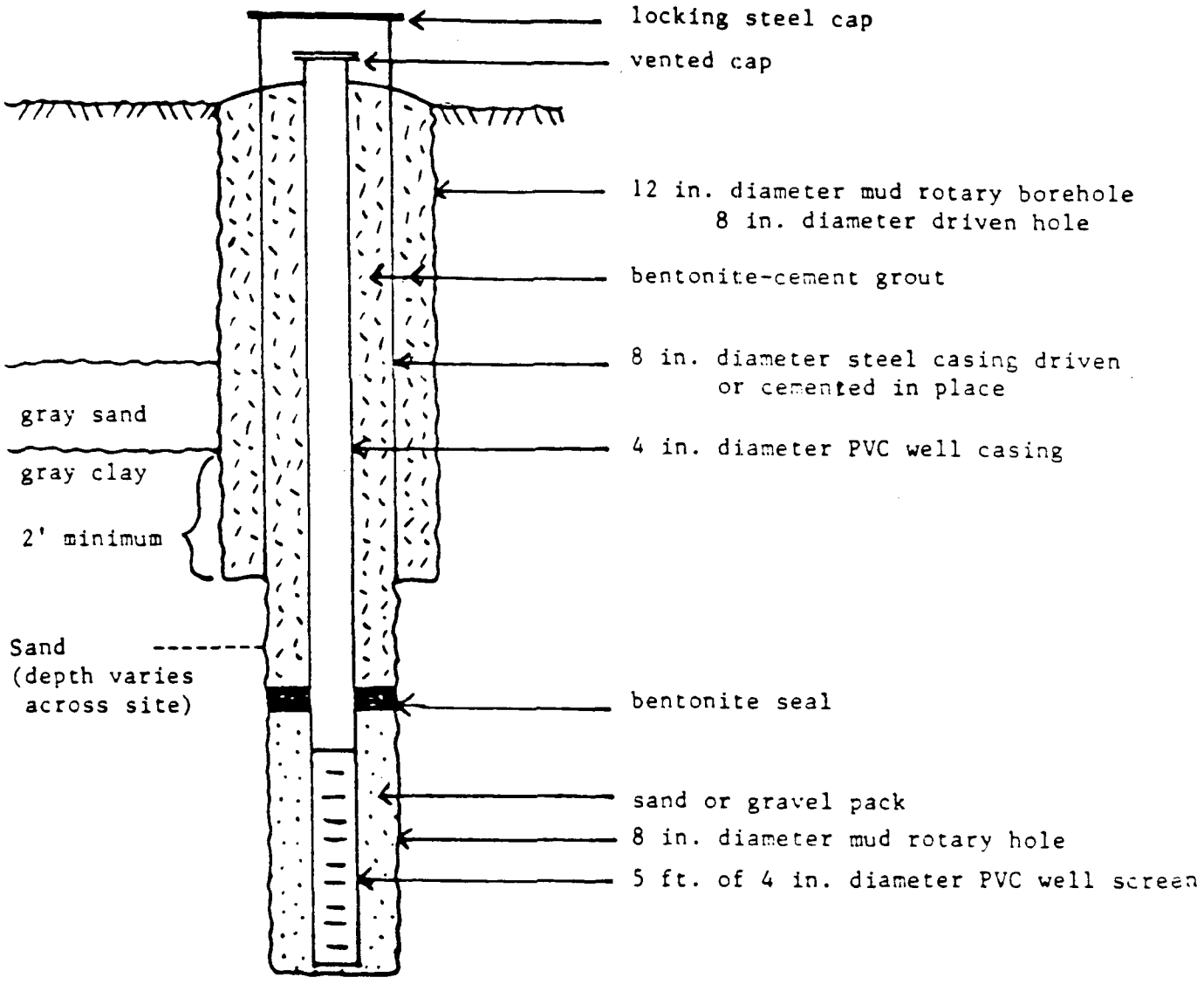
To avoid contaminating the well with surface water, a minimum of two feet of bentonite-cement grout will be installed. Well screens will be adjusted so as to avoid creating a conduit through underlying clay units for downward migration of any contaminants which may be present within the shallower saturated zones.



Note: A water tight protective cap will be used on wells in all areas subject to flooding.

Figure 9.3: Proposed Construction of Shallow Monitor Wells

Actual depths may vary depending on site conditions.



Note: A water tight protective cap will be used on wells in all areas subject to flooding.

Figure 9.4: Proposed Construction of Deep Monitor Wells

Actual depths may change depending on site conditions.

IV. SAMPLING METHODOLOGIES (continued)

A. Well Construction (continued)

The wells will be developed by over pumping, air surging, or by another appropriate method selected by ENVIRON. All wells will be surveyed by a registered land surveyor to an accuracy of plus or minus 0.01 feet, and water table/potentiometric data will be obtained one to three days after the wells have been developed. Deeper wells below the clay layer will be drilled in a manner to avoid introducing any shallow contamination into deeper aquifers, by double casing the drill hole using mud rotary or standard penetration boring techniques. The shallow sand layer will be cased and sealed before drilling beyond the subsurface layer of gray clay. Sampling of wells will occur approximately one week after all well construction is complete.

B. Soil Borings

Shallow soil borings will be drilled with a hollow stem auger. Soil samples will be collected with split spoons.

C. Sample Collection

Each sample container will be labeled and the method of collection and location recorded in a field log book. The samples will be placed in containers prepared and supplied by the laboratory. Strict chain of custody records and procedures will be followed. To provide quality control, soil

IV. SAMPLING METHODOLOGIES (continued)

C. Sample Collection (continued)

and water duplicate samples will be collected and analyzed. One duplicate sample will be collected and analyzed for every lot of twenty samples for each analytical parameter in each medium. To monitor the efficiency of field decontamination procedures, a field or wash blank will be collected for every twenty samples and analyzed for each analytical parameter for which samples were collected. In addition, on days that VOC samples are collected, a trip blank which will accompany the crew during all sampling will be analyzed for VOCs.

D. Field Procedure Protocols

For details on the sampling and field procedures to be followed at this site, refer to the ENVIRON Manual of Field Procedures.

V. ANALYTICAL METHODOLOGIES

A. Laboratory Selection

Century Laboratories, Inc. of Thorofare, NJ will analyze all water and soil samples.

B. Analytical Methodologies

TPHCs will be analyzed for in water by EPA Method 418.1, and in soil by EPA Method 418.1 following Soxhlet extraction. VOCs will be analyzed for in water by EPA Method 624, and in soil by EPA Method SW846:8240. The pH of water sampales will be measured in the field. Lead will be analyzed for in water by EPA Method 239.2, and in soil by EPA Method 7420. PCBs will be analyzed for in water by EPA Method 608, and in soil by EPA Method SW846:8080. Bromide will be analyzed for in both water and soil by EPA Method 320.1. Details on analytical methodologies are included in the laboratory QA/QC manual available from the laboratory.

The laboratory will not be informed which samples are duplicates or blanks. Each sample will be marked only with a Chain of Custody number, the date and time collected, and the analysis to be conducted.

All laboratory analyses will be documented by an ECRA Tier II data package, as appropriate.

C. Splitting Samples with NJDEP

Upon request, provisions will be made to provide the NJDEP with split samples.